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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/750,221	12/29/2000	Sung-Chun Jun	P 275721 P00H9026/US/ky	6597

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EXAMINER	
TUCKER, WESLEY J	

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/750,221	JUN, SUNG-CHUN	
	Examiner	Art Unit	
	Wes Tucker	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October-14-2004 has been entered.

Response to Amendments and Arguments

1. Applicant's response to the last Office Action, filed August 16, 2004, has been entered and made of record.

2. Applicant has amended claims 6-10 and cancelled claims 11 and 12. Claims 6-10 are pending.

3. Applicant's arguments have been fully considered but are not persuasive for at least the following reasons:

4. Applicant has amended claims 6-10 to include a CMOS image sensor. A CMOS image sensor is not disclosed anywhere in the specification and is therefore considered new matter.

5. Further the way in which Li uses the term pixel is the way it is conventionally used in the art. Broadly interpreted Li's pixels "output digital image data corresponding to one or more characteristics of light incident thereon" because the pixels represent luminance values and color values which are by definition a measure of color or light thereon.

6. In regard to 3x3 two-dimensional space filters, they are well known in the art for many different advantages. Further the applicant does not disclose any "advantage discovered" in using the 3x3 format to increase the speed of operation or otherwise.

7. In regard to the target pixel being deemed defective and being corrected accordingly and with more speed than Li, the effect of the correction is interpreted the same as that of the applicant. As to the argument that the apparatus of Li cannot be applied to a CMOS image sensor due to size and algorithms that are not compatible with CMOS image sensors, there is no explanation of how applicant's invention is compatible with CMOS image sensors.

8. The rejection of claims 6-10 is maintained.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 6 was amended to read "A CMOS image sensor having..." Claim 6 previously stated "An apparatus, for use with an image sensor having..." Nowhere in the specification is it disclosed that the invention uses a CMOS image sensor. Therefore the introduction of a CMOS image sensor is considered to be new matter.

Further the invention as disclosed on page 1, lines 15-25 of the specification is related to an image obtained by an image sensor. After the image is sensed it is converted to a digital signal. On page 3, lines 16-25 of the specification once the digital is received then calculations are performed to determine the quality of the image sensor. Therefore an apparatus for use with an image sensor and an image sensor are two different inventions.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 was amended to add the limitations of "...the target pixel is larger than a first value, which multiplies a first coefficient by a maximum value... or smaller than a second value, which multiplies a second coefficient..." The problem with this language is the "value, which multiplies." This implies that the value multiplies two numbers or is multiplied by two numbers. This is incorrect in the context of the invention. The language should be changed to reflect the nature of the operation such as "...the target pixel is larger than a first value, obtained by multiplying a first coefficient by a maximum value..." Appropriate correction is required.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 6,453,068 to Li and U.S. Patent 5,887,085 to Otsuka and further in view of U.S. Patent 5,930,007 to Kojima.

12. With regard to claim 6, Li discloses an apparatus, for use with an image sensor having an array of unit pixels, each of which outputs digital image data corresponding to

one or more characteristics of light incident thereon (column 1, lines 55-62), for detecting and compensating for a defective pixel, comprising:

A defective pixel detecting circuit constructed and arranged to determine whether a target pixel corresponding to one of the pixels is defective based on a check condition (column 2, lines 5-15), wherein the check condition is whether a value of the target pixel is larger than a first value, which multiplies a first coefficient by a maximum value of adjacent normal pixels (column 6, lines 29-35), or smaller than a second value, which multiples a second coefficient by a minimum value of adjacent normal pixels (column 6, lines 44-50). Here once it is determined whether the pixel value is above the maximum or below the minimum value a signal is received indicating an overshoot reduction coefficient for reducing or increasing the pixel value accordingly.

Li further discloses a compensation circuit constructed and arranged to compensate the image data of a target pixel deemed to be defective and outputting compensated image data (column 2, lines 10-15). Li discloses the use of a dedicated circuit or any other suitable electronic circuit means (column 5, lines 13-16).

Li does not disclose a first line memory for storing therein the image data fed thereto from the unit on a pixel-by-pixel basis or a second line memory for receiving the image data stored in the first line memory and storing the same therein. However line scanners are well known in the art and this is a typical way of processing image data obtained by a line scanner. Otsuka discloses a line scanner that obtains pixel information with a CCD imaging device line by line. A line is stored in a first line

memory 4A, a shading correction unit that must contain a line memory after being converted from analog to digital, and from the correction unit 4A the line data is sent to buffer memory 4B or a second line memory to be stored (column 4, lines 15-38 and Fig.1, elements 4A and 4B). Therefore it would have been obvious to one of ordinary skill in the art to store scanned line data in the line memories as taught by Otsuka in order to provide scanned line data on a line by line basis.

Li further discloses a two-dimensional space filter (column 6, lines 1-5) for receiving the image data. In the combination of Li and Otsuka the data from the line scanner of Otsuka is fed thereto from the second line memory as disclosed by Otsuka (column 4, lines 33-40), the image data inputted thereto from the first line memory and the image data provided thereto from each pixel on a line-by-line basis as disclosed by Otsuka (column 4, lines 16-25), and respectively storing the unit pixel of the digital image data in a first set of lines, a second set of lines, and a third set of lines (column 4, lines 16-25). Element 4C is interpreted as a third set of lines and as the image data is scanned line by line it is inherent that there be several line memories for each scanned line.

Li does not however explicitly disclose that the filter is a 3x3 filter. Li discloses a 5x5 filter and teaches that any size or type of FIR filter may be used according to need (column 5, lines 1-11). Kojima discloses an example wherein a 3x3 or a 5x5 filter maybe used according to need as the 3x3 filter provides priority to resolution while the 5x5 filter provides priority to gradation (column 8, lines 30-40). Therefore it would have

been obvious to one of ordinary skill in the art at the time of invention to use a 3x3 filter instead of a 5x5 filter as taught by Kojima according to a need or desired result.

13. With regard to claim 7, Li discloses an apparatus according to claim 6, wherein in the defective pixel circuit further comprises a defective pixel determination circuit constructed and arranged to receive the image data provided thereto from the space filter, determine whether or not image data of a target pixel is defective based on the check condition (column 2, lines 5-15), and outputting a defective pixel determination signal, a minimum range violation signal and a maximum range violation signal according to determined results (column 2, lines 10-15), wherein the defective pixel determination signal represents that the image data of the target pixel has a value larger than the first value (column 6, lines 29-35), or a value smaller than the second value of image data of adjacent normal pixels in the space filter (column 6, lines 44-50), the maximum range violation signal representing that the image data of the target pixel has a value larger than the first value; and the minimum range violation signal representing that the image data of the target pixel has a value smaller than the second value (column 2, lines 10-15). Here once it is determined whether the pixel value is above the maximum or below the minimum value a signal is received indicating an overshoot reduction coefficient for reducing or increasing the pixel value accordingly.

14. With regard to claim 8, Li discloses an apparatus according to claim 7, wherein the defective pixel compensation circuit includes means for combining the minimum

range violation signal and the maximum range violation signal provided thereto from the defective pixel detection circuit (column 2, lines 7-14). Here an input overshoot reduction is received which is either a negative or a positive value depending on whether the pixel value was above or below the designated threshold. So this is effectively giving one range violation signal just with a positive or negative sign indicator.

Li further discloses a first selector constructed and arranged to selectively output the minimum value of image data or the maximum value of image data in response to output from the combining logic (column 2, lines 5-14). The overshoot coefficient is output depending on the known local maximum or minimum values.

And a second selector constructed and arranged to select one of the output signals from the first selection means and the image data of the target pixel, in response to the defective pixel determination signal from the defective pixel determination means, and outputting the same as the compensated image data (column 2, lines 15-25). Here the pixel value is adjusted according to whether the pixel value is above a maximum or below a minimum value in response to determining if the pixel is defective.

Li further discloses the conditions that if the image data of the target pixel has a value larger than the value and is determined as the defective pixel, the maximum data is outputted as the compensated image data; and if the image data of the target pixel has a value smaller than the second value and is determined as the defective pixel, the minimum image data is outputted as the compensated image data (column 2, lines 43-46 and column 7, lines 30-35 and column 9, lines 21-25). Here the method for

outputting compensated image data is disclosed using an overshoot attenuation coefficient that can be changed according to the level of control desired. Factors of 0.25, 0.5, and 0.75 are all mentioned as attenuating the overshoot amount by 25%, 50%, and 75% respectively compensating the range violation degrees by these amounts of the actual range violation. The factor of 1.0 would be used to bring a positive overshoot amount to the maximum threshold value to be output or a negative overshoot amount to the minimum threshold value to be output by completely attenuating the overshoot amount it yields the maximum or minimum value that was over or undershot.

15. With regard to claim 9, Li discloses an apparatus according to claim 8, wherein the first and the second coefficients are selected based on process characteristics of the image sensor (column 2, lines 5-7). The first and second coefficients represent maximum and minimum values of adjacent pixels in the image. It is inherent that they are selected based on process characteristics of the image sensor. Whatever the image sensor senses will be used as the image data used to determine the minimum and maximum values of the pixels surrounding a target pixel.

16. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,453, 068 to Li.

With regard to claim 10, Li discloses an apparatus according to claim 8, wherein the first and the second coefficients can be 0.25, 0.5, or 0.75 by way of example to attenuate overshoot amount accordingly (column 2, lines 5-10, column 7, lines 30-35 and column 9, lines 21-25). Therefore it follows that the coefficients may also be numbers such as 1.1 and 0.9, respectively as discussed with regard to claim 8. Here coefficients are interpreted as threshold values as described in the claims above and with the specification. It is understood from the reference of Li that maximum and minimum values can be assigned as appropriate and as discussed in claim 3, the minimum and maximum values and the corresponding overshoot coefficients can be assigned for any number of percentage values. Therefore it would have been obvious to one of ordinary skill in the art to use the values of 1.1 or 0.9 according to need or desired effect.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 703-305-6700. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wes Tucker

12-16-04

Jon Chang
Primary Examiner